Editor's Note: While many Internet access providers use operating systems other than UNIX, it is the most widely used system on the Internet. Even non-UNIX systems frequently use UNIX-like commands. Many of the basic commands discussed in this article will be applicable to whatever system you have.

As you explore the Internet, chances are that you will use or dial into a computer system that works with the UNIX operating system. If you're only familiar with DOS or Macintosh computers, trying to use UNIX can make you feel like a stranger in a strange land.

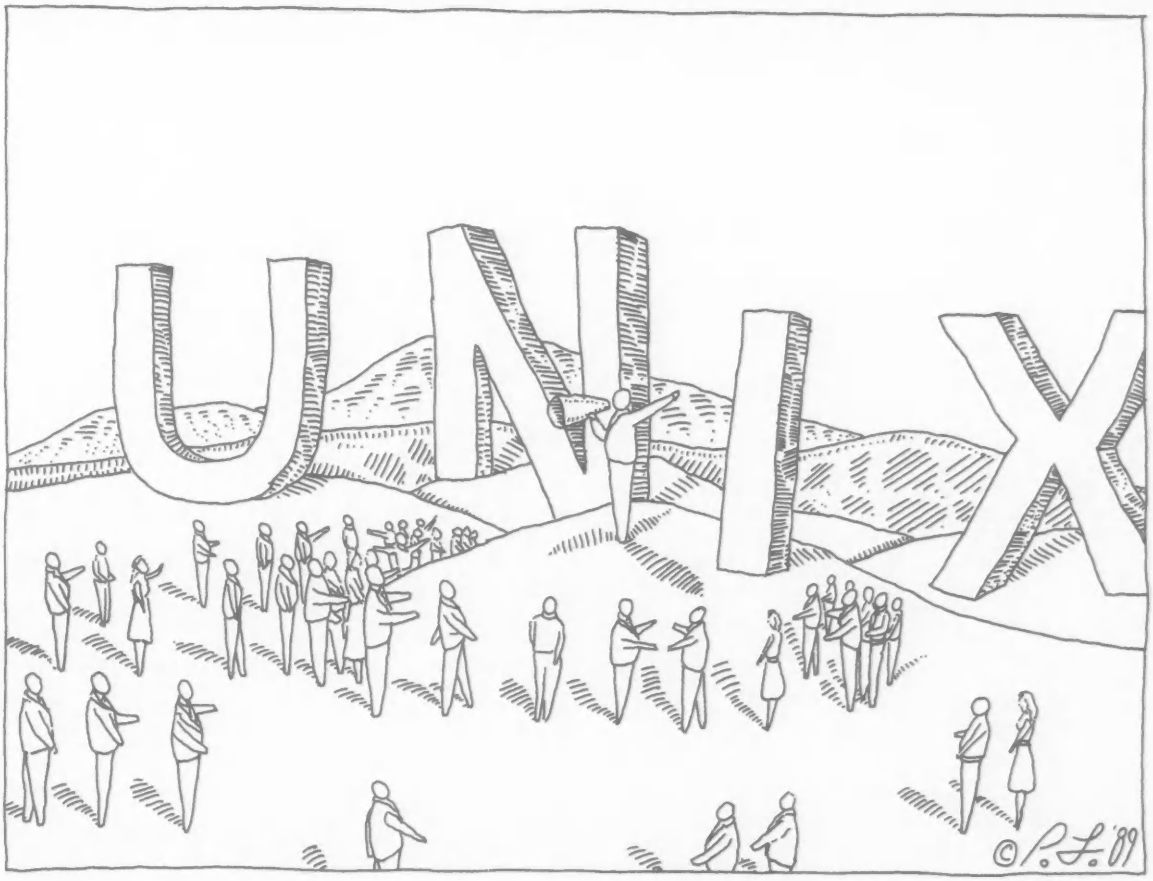
UNIX is the most popular operating system on the Internet because it is available for a wide variety of computer platforms and has a multi-user, multi-tasking environment. This means that several people can use a UNIX computer simultaneously—and each person can run several programs at once.

UNIX: Learning the

BY KEVIN M. SAVETZ

The system was developed in 1969 at the Bell Laboratories. Since its creation, UNIX has seen countless updates, revisions and spinoffs. Today, there are flavors of UNIX with names like SCO UNIX, BSD and System V. These versions are very similar, but it is important to know what one you're using when you have a question or are looking for a book on UNIX.

Here's the basic information you will need to use UNIX. With practice you will be able to combine commands to easily perform otherwise complex tasks.



Paul J. Fisch

Language of the Internet.....

Logging in and out

To access a UNIX system, you'll need the system administrator to set up your own account. When you want to get on the system, you enter your account name and a secret password. (For more on passwords, see "10 Things Not To Use As Your Password.") The computer uses this information to verify who you are, give you access to the information that belongs to you and keep other users out of your files. If you're legit, you'll see the UNIX prompt, your signal that the computer is ready to take a command.

If you use DOS, you're familiar with a prompt like (`C:\>`). UNIX prompts vary from system to system, but it is likely to be a dollar sign (`$`) or a percentage sign (`%`).

When you log on, you may also see the system "message of the day" (or MOTD, pronounced mot-dee) announcing anything the system administrator thinks you need to know. You may also see a message if you have any unread electronic mail.

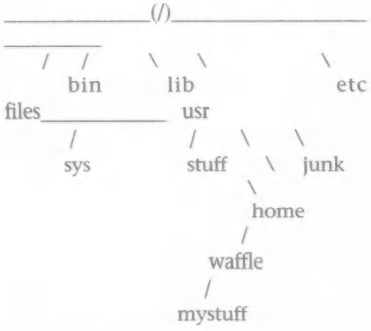
To log off the system, simply type `logout`. This is important because it tells the computer you don't plan on using it for a while and will prevent others from looking through your files.

Files and directories

If you've used another computer operating system, you are already familiar with the concepts of files and directories. **Files** are individual collections of information (a letter to Aunt Zelda, a picture of the moon or a game's software) stored on a computer. **Directories** allow you to place files in a logical manner so you can find them later. UNIX files and

directories are very similar to those on DOS computers.

Your account has a **home directory**, which is where you start by default when you log on to the system. You can change your current directory, list its contents, create new directories and remove ones that are part of your home directory. Like DOS, UNIX uses a hierarchical directory structure. This means that there is one **root directory**, and many sub-directories in which you can store files. A diagram of the structure might look like the following:



A file in the `mystuff` directory can be referred to as `/files/home/waffle/mystuff/filename`.

This is the filename's full path. The first `/` must be there for it to be a full path. If you leave it off, UNIX will look for the file starting in the your present directory. (Leaving off the `/` can be useful because constantly referring to files by their full pathnames gets tedious. If you were in `waffle` and wanted to refer to *filename* in the `mystuff` directory, you could call it `mystuff/filename`. If you are already in `mystuff`, just use `filename`.)

If you use DOS on your home computer, note that UNIX uses a forward slash (`/`) between directory names instead of a backslash (\ ).

If you use DOS, you're also used to restrictive filenames with eight letters, a period and an extender of three more letters (for example, *GRANDMAS.LTR*). If you use a Macintosh, you have the luxury of filenames of up to 31 characters. Depending on what flavor of UNIX you're using, you may be allowed filenames from 14 to 255 characters. Unlike DOS—which only allows A thru Z, 0 thru 9 and the underline in filenames—UNIX filenames can contain just about any character you can type on the keyboard. (Some characters—the asterisk, brackets and spaces—can be used, but can also get you in sticky situations later. It's best to avoid using them.)

Basic UNIX Commands

Below are some important commands for manipulating files and directories. The first rule of UNIX: Use and love the `man` (manual) command. Typing `man cp`, for instance, will tell you everything you could want to know about the `cp` command. Type `man man` and `man intro` for general system help. Most of the following commands take special options, called arguments, for tweaking how they work. There isn't room here to list each command's options and arguments, so make judicious use of the `man command`.

pwd - Stands for "present working directory," and it will tell you in which directory you currently are. Log on to your system and type `pwd` to find out what your home directory is called.

ls - Lists all the files and directories under your present working directory. One problem: The `ls` command doesn't tell you whether you're looking at the names of files or directories. Not to worry—if you type `ls -CF`, you'll get a nicely formatted list where executable files (programs) are indicated with an asterisk and directories by a slash.

Some files in UNIX are normally invisible (hidden) files. Any filename that begins with a period—such as *.newsrc* and *.login* —isn't normally shown when you enter the `ls` command. You can see them, however, if you explicitly ask to see all files by adding the `a` argument to the `ls` command: type `ls -a` or `ls -aCF` (yes, capitalization matters!) to see your invisible files. Invisible files usually specify your system configuration--or, perhaps you simply have something to hide.

cd - Stands for change directory. You can move to a subdirectory under your present directory by typing, for example, `cd mystuff`. To move back to the previous one, type `cd ..` (That's two dots. Why two dots? It's a mystery to me.) If you know exactly what directory you want to go to, you can type a command like `cd /lib/sys`.

cp - Is an abbreviation for copy. Not surprisingly, the `cp` command lets you copy a file. Typing `cp file1 file2` will create a new copy of *file1*, called *file2*, in your present directory. Typing `cp file1/files/home/wombat` will put a copy of *file1*, still called *file1*, in the `files/home/wombat` directory. Typing `cp file1/files/home/wombat//file2` will make a copy of

UNIX VS DOS

Here are some important ways in which UNIX differs from DOS.

The DOS prompt looks like `C:\>`	The UNIX prompt looks like `$` or `%`
DOS uses backslashes \	UNIX uses forward slashes /
DOS filenames are restricted to eight letters, a period and an extension of three more letters *(GRANDMAS.LTR)*	UNIX filenames can range from 14 to 255 characters.
DOS filenames can consist only of the letters A thru Z, the numbers 0 thru 9 and the underline character.	UNIX filenames can contain just about any keyboard character.

• In UNIX, there is no "undelete" command. Once your file is gone, it's gone forever.

file1, called *file2*, in `/files/home/wombat`. Whew!

mv - Is an abbreviation for move, and lets you move files around directories. Moving a file will copy that file to your specified directory and then delete the original.

rm - Stands for remove. This command will let you erase files that you no longer need. Be careful! There is no "undelete" command in UNIX. Once your file is gone, it's gone forever.

Typing `rm file2` will erase that file from your present directory. Typing `rm*` will delete every file in the directory. In UNIX, like in DOS, the asterisk means "all files".

cat - Stands for catenate, an obscure word meaning "to form a chain or series." In its most basic use, cat works just like the DOS TYPE command; it displays the contents of a text file. Actually, you can use it to display the contents of any file, but binary files (like programs and digitized pictures) will only appear as garbled data. To display a file, just type cat letter_to_grandma and the computer will print the letter to your screen. If the text in the file is too long, the beginning will scroll off the top of the screen faster than you can read it. Which brings us to the next command...

more - Shows you the contents of a text file one page at a time. If you type `more letter_to_grandma`, you'll see the word "more" after each screen of text. Strike the space bar when you're ready to see the next page of text. Your system may also have a program called `less`, which does the same as more, only better. As they say, less is more. :-) Don't forget to type `man less` or `man more` for complete information or more options.

chmod - Can be used to change the permissions of a file, or those users who have access to a particular file. Remember that UNIX is a timesharing system that can be used by many people simultaneously. You might want to keep some of your files - for instance, your electronic mail - private, but let other users read or modify certain files. So chmod, which stands for "change mode," makes it possible to allow/deny yourself, all system users or only certain users to read, write or execute your files. For more information (you saw this coming, right?) type `man chmod`.

MISCELLANEOUS COMMANDS

Here are some other commands that are important, but don't really fit in with other groups.

man - OK, I already mentioned this one, but I'm mentioning it again to make sure you know how to RTFM (read the manual). The `man` command shows you the "manual page" for a particular command. For instance, `man ls` will give you lots of information about the `ls command`.

vi or **emacs** - Are text editors or programs that allow you to create text files (such as e-mail messages, programs or letters to Aunt Zelda). If you're just starting out, try using "vi." It's not the simplest text editor available, but it's easier than emacs. In contrast, emacs is a software behemoth that will edit files, tell your fortune and teach you how to make cookies. (Really.)

lpt or **print** - May let you print a text file on a printer connected to the UNIX computer. Two caveats: First, never try to print a non-text file—anything that looks like gibberish when viewed onscreen with the cat command will look worse on paper. Second, if you're working from a college computer lab or your office and know there's a printer down the hall, feel free to use the print command. However, if you're using a dial-up UNIX system—and the main terminal is hundreds of miles away—don't use the printer unless you intend to drive there to pick up your printout!

grep - Stands for "global regular expression print," which is a verbose way of saying that this program will search through files and output any lines that containing text you specify. If you've ever read Usenet news, your home directory contains a hidden file called *.newsrc* which lists all the newsgroups available to you. Typing `grep`

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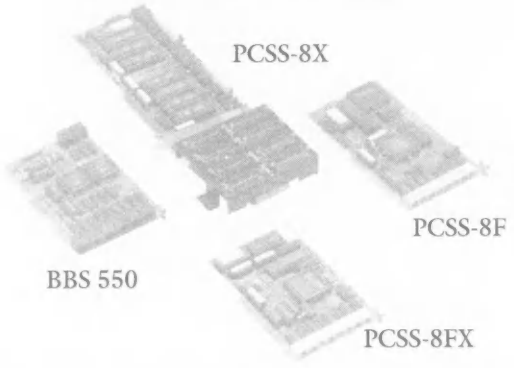

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amiga.newsrc will list all the lines in the file that contain the word "amiga."

passwd - Allows you to change your password. Typing **passwd** will prompt you for your old password then ask you to type your new password twice. Passwords you type should never be visible on your screen.

compress and **uncompress** - Are a pair of programs that will compress or decompress the file (or files) of your choice. Compressed files end in the extension ".Z" and take up less disk space than uncompressed ones. Many of the files available via the Internet's ftp program are compressed to save space and reduce transfer time. Similar to .zip files on a DOS computer and .sit files on a Macintosh, UNIX's compressed files take up relatively little space. But, they aren't useful until they've been uncompressed. To use these commands, just type **compress filename** or **uncompress file name.Z**.

FOR MORE INFORMATION

This article has just given you enough information about UNIX to be dangerous. UNIX is a complex operating system made up of hundreds of commands, oddball nomenclature and countless little quirks. Don't worry—the Internet is rife with beginner's information about UNIX. To explore more of the basics, check out one of the following:

• The UNIX Frequently Asked Questions list. This huge, seven-part list of questions and answers explores the ins and outs of UNIX. Users of all knowledge levels will learn something from this file. It is available via FTP as **rtfm.mit.edu:/pub/usenet/news.answers/unix-faq/faq/part1** (as well as part2 through part7.)

• The comp.unix.user-friendly Frequently Asked Questions (FAQ) list, available via anonymous FTP from **ftp.wfu.edu:/pub/usenet/cuuf-FAQ**.

• A Concise Guide to UNIX Books. This lists contains selections of the best books and documentation on UNIX

and related subjects (such as UNIX editors and shells.) It's obtainable via anonymous ftp from **rtfm.mit.edu:/pub/usenet/news.answers/books/unix**. If you do not have FTP access you can get it by sending e-mail to **mail-server@rftm.mit.edu** with a message body of **send usenet/news.answers/books/unix**.

• The Usenet newsgroups **comp.unix.user-friendly, comp.unix.questions, comp.unix.shell** and **news.answers**

If you prefer learning from traditional books, rent a forklift for your return trip from the library or bookstore. Dozens of fine UNIX books abound. Be sure that the book you pick is tuned to the version of UNIX you use (for instance, System 7 or BSD.) If you're not sure which book to read, start with one of these:

• *Learning the UNIX Operating System*, 3rd edition, by Grace Todino, et al. Published by O'Reilly & Associates, ISBN 1-56592-060-0. An introduction to UNIX, including information on electronic mail, networking and X-Windows. Geared toward users who need to better understand UNIX to make the most of the Internet.

• *UNIX for Dummies* by John Levine and Margaret Levine Young. Published by IDG, ISBN: 0-878058-58-4. An informal and non-technical introduction to UNIX.

• *Exploring the UNIX System*, 2nd edition, by Stephen Kochan and Patrick Wood. Published by Hayden books. ISBN: 0-672-48447-1. A basic overview of UNIX structure and commands from the ground up. (This was my first UNIX book.)

• *A Student's Guide to UNIX* by Harley Hahn. Published by McGraw Hill. ISBN: 0-07-025511-3. In a clear and lively language, the author tells novice users everything they need to know about UNIX and the Internet. The book covers commands, utilities, shells, vi, X-Windows, e-mail, and other topics.

• *UNIX in a Nutshell* by Daniel Gilly. Published by O'Reilly & Associates. ISBN: 1-56592-001-5. A complete reference guide containing all UNIX commands and options, along with lots of examples and descriptions of the commands. Versions for System V releases 3 and 4 and Solaris 2.0, SCO UNIX and BSD systems are available.

10 Things NOT To Use As Your Password

On any Internet system, not just UNIX, your password is the only thing standing between you and disaster. If someone should guess your password, he or she will be able to read your electronic mail, snoop in your files, delete your work and post electronic mail or Usenet news messages that will appear to come from you. That can be embarrassing, annoying and dangerous.

UNIX systems use a tricky feature called one-way password encryption. When you first choose a new password, the computer encrypts your password—so thoroughly that it can never be decrypted—and only stores the encrypted version. Later, when you type your password while logging in, the computer encrypts your guess using the same method and compares the encrypted version of your guess to the encrypted version of your actual password. If they match, you're allowed in.

Although your password can't be decrypted, you're never perfectly safe. Unscrupulous crackers can use the encryption routine to stab guesses at your password. At least one computer program is available that can quickly and silently encrypt every word in the dictionary and compare it to the list of encrypted passwords on your system. Therefore, if your password is in the dictionary, you can get zapped.

A variety of other passwords that aren't in the dictionary are also bad choices because they're very easy to guess. The following is a partial list of words that should not be used as passwords.

- **password**
- **opensaysme**
- **letmein**
- your initials
- your login name
- your cat's name
- your spouse's name
- any information that can be found by looking up your account name on the system, such as your phone number, name, etc.
- any word that's in the dictionary

To be as safe as possible, make your password a bunch of unrelated characters, such as **K#*2ww>**. Use a combination of upper and lower case letters, punctuation and numbers. If you find this type of password too hard to remember, try using two unrelated words separated by a punctuation mark, like **explore*grasshopper**.

Kevin Savetz is a computer journalist based in Arcata, California. He believes that UNIX is more afraid of you than you are of it. Kevin can be reached via e-mail at **savetz@rahul.net** *(Internet) and* **Savetz** *on America Online.*